



BIRNEY-DECKER WILDLIFE STUDY

Progress Report No. 1

Fall and Winter
(September 1974 - February 1975)

Research Conducted by:

Montana Department of Fish and Game
Environment and Information Division

Sponsored by:

Bureau of Land Management

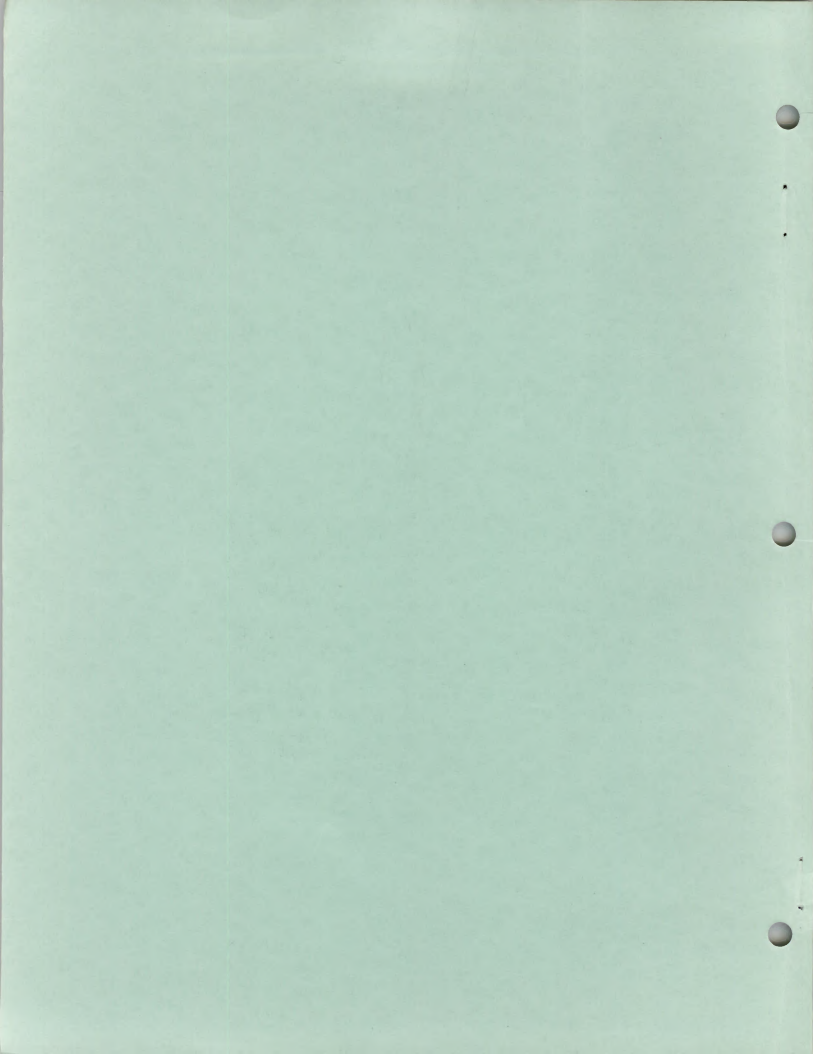


Prepared by:

Stephen J. Knapp
Biologist
June 1975

QL
188
.K57
1975

PROPERTY OF
Bureau of Land Management
B L M LIBRARY



#6550199

JD 89070076 3/23

QL
188
K57
1975



PROPERTY OF
Bureau of Land Management
D S C LIBRARY

BLM Library
Denver Federal Center
Bldg. 50, OC-521
P.O. Box 25047
Denver, CO 80225

Since this is a progress report only, results presented herein are not necessarily final, and may be subject to change. For this reason, the information contained in this report may not be published or used for other purposes.

BLM Library
Denver Federal Center
Bldg. 30, GC-521
P.O. Box 25047
Denver, CO 80222

TABLE OF CONTENTS

	Page
List of Tables	iii
List of Figures	iv
I. Introduction	1
II. Study Area	4
Location	4
Physiography	4
Climate	5
III. Results	5
Vegetation	5
Ponderosa Pine Subtype	6
Grassland Park Subtype	6
<i>Rhus</i> -Grass Subtype	6
Deciduous Shrub Subtype	6
Big Sagebrush-Grassland Subtype	6
Ponderosa Pine-Juniper Subtype	7
Silver Sage Subtype	7
Grassland Subtype	7
Greasewood Subtype	10
Big Game	10
Mule Deer	10
Distribution	10
Use of Habitat Types	11
Ashland Lease Area	11
Upper Otter Creek Lease Area	12
Hanging Woman Lease Area	13
Decker Lease Area	15
Canyon Creek Lease Area	15
Custer National Forest	16
Seasonal Use of Topography	17
Mule Deer Activity and Use of Exposures	18
Food Habits	19
Population Characteristics	21
Ashland Lease Area	21
Upper Otter Creek Lease Area	21
Hanging Woman Lease Area	21
Decker Lease Area	21
Canyon Creek Lease Area	22
Custer National Forest	22
Harvest Data	22
White-tailed Deer	22
Activity and Use of Slope	23
Food Habits	24
Population Characteristics	24
Harvest Data	25

	Page
Pronghorn Antelope	25
Use of Habitat Types	25
Ashland Lease Area	25
Upper Otter Creek Lease Area	26
Hanging Woman Lease Area	27
Decker Lease Area	27
Canyon Creek Lease Area	28
Custer National Forest	28
Activity and Use of Topography	28
Food Habits	29
Production	29
Harvest	29
Small Game	31
Sharp-tailed Grouse	31
Use of Habitat Types	31
Activity and Use of Slope	34
Food Habits	35
Harvest	36
Sage Grouse	36
Use of Habitat Types	36
Activity and Use of Topography	37
Food Habits	37
Harvest	38
Pheasant	38
Use of Habitat Types	38
Activity and Use of Topography	39
Food Habits	39
Harvest	40
Turkeys	40
Food Habits	41
Harvest	41
Partridge	41
Waterfowl	41
Harvest	44
Nongame	44
Literature Cited	45

LIST OF TABLES

Table	Page
1. Habitat types and subtypes	5
2. Percent of seasonal use of habitat types in the Ashland lease area by mule deer from 390 ground and aerial observations	12
3. Seasonal use of habitat types in the Upper Otter Creek lease area by mule deer from 435 ground and aerial observations	13
4. Seasonal use of habitat types in the Hanging Woman lease area by mule deer from 322 ground and aerial observations	14
5. Seasonal use of habitat types in the Decker lease area by mule deer from 419 ground and aerial observations	15
6. Seasonal use of habitat types in the Canyon Creek lease area by mule deer from 243 ground and aerial observations	16
7. Seasonal use of habitat types on the Custer National Forest by mule deer from 88 ground and aerial observations	17
8. Mule deer seasonal use of topography (748 observations).	18
9. Mule deer activities (906 observations) and use of exposures (119 observations)	19
10. Fall and winter food habits of mule deer within the Birney-Decker unit	20
11. Seasonal habitat use of white-tailed deer from 124 ground and aerial observations	23
12. Seasonal activity and use of slope by white-tailed deer from 105 and 108 observations, respectively.	24
13. Seasonal habitat use by antelope on the Ashland lease area from 202 ground and aerial observations	26
14. Seasonal habitat use by antelope on the Upper Otter Creek lease area from 363 ground and aerial observations	26
15. Seasonal use of habitat types by antelope on the Hanging Woman lease area from 649 ground and aerial observations	27
16. Seasonal use of habitat types by antelope in the Decker lease area from 197 ground and aerial observations	27
17. Seasonal activity and topography use by antelope	28
18. Fall and winter food habits of antelope	30
19. Habitat use by sharptails during fall and winter from 438 aerial and ground observations	34
20. Activity and use of topography by sharptails during fall and winter	35
21. Fall and winter food habits of sharp-tailed grouse from seven crops	36
22. Fall and winter habitat use by sage grouse from 124 observations	37
23. Seasonal activity and use of topography	37
24. Seasonal habitat use by pheasants from 231 aerial and ground observations	38
25. Seasonal activity and use of topography by pheasants	39

LIST OF FIGURES

Figure	Page
1. Study area with five potential coal lease areas	2-3
2. Big game fall and winter distribution	8-9
3. Small game fall and winter distribution	32-33
4. Nongame fall and winter distribution	42-43

INTRODUCTION

With the increasing interest in developing coal by strip mining in eastern Montana, it behooves the Montana Department of Fish and Game to update and intensify its knowledge of the quantity and quality of the wildlife resource in this region. The intense interest in strip mining coal, building electric generating plants and possibly gasification plants, may have drastic and long-term disruptive effects on the terrestrial and aquatic ecosystems and their dependent wildlife.

The reasons for our concern are many. There are a growing number of people who believe that wildlife have their own birthright, the right to just coexist. Second, wildlife and the wildlands they inhabit are providing a growing recreational outlet for millions of Americans every year. This is no longer considered a luxury by our cosmopolitan neighbors, but a real need, whether it be to hunt, fish, photograph or just look at our wildlife heritage. Third, and probably most critical in today's increasingly polluted world, is the use of wildlife as complex but delicate indicators of the well-being of our earth's life systems. The more we learn about the biology of wild animals, the more we come to understand the place where we live and how we can make wiser use of our natural resources.

Strip mining of coal is a dominant use of the resources of a particular area. It does not allow for multiple use management of the renewable resources that occupy the same land space, such as cattle, wildlife, forests and watersheds.

If there is to be industrial development, the value of the renewable resources to be affected must be known and the inevitable trade-offs, compromises and mitigations fully realized.

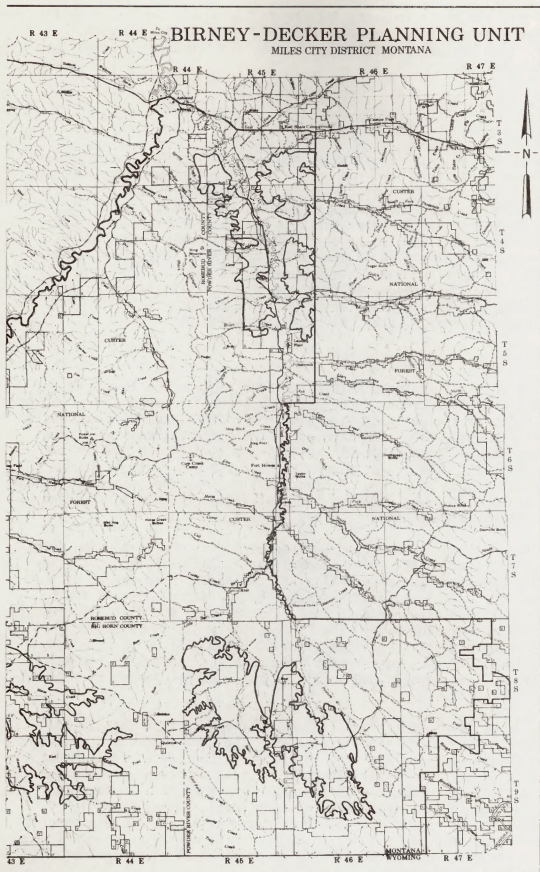
To answer this need for the wildlife resource, the Montana Department of Fish and Game and the Bureau of Land Management entered into contract. The generated data will help supply the needs of the department and also of the bureau for their continuing Birney-Decker resource study.

The objectives of the contractual agreement are:

- (1) To develop techniques to quantify the fish and wildlife resources, including game and nongame species, either directly or through habitat quality and population productivity indices to allow reasonable predictions to be made on the effect of development on the fish and wildlife resource.
- (2) Ascertain key ecological requirements of fish and wildlife resources to provide a basis for reclamation and revegetation guidelines.
- (3) To develop plans and procedures for mitigating and/or compensating any loss of wildlife or habitat through the surface mining process.



Figure 1. Study area with five potential coal lease areas.



During this report period, and for the following six months, emphasis is being placed on obtaining baseline data on seasonal distribution, habitat use, food habits, productivity indices and breeding areas of game and nongame wildlife.

STUDY AREA

Location

The Birney-Decker area encompasses about 900,000 acres in southeastern Montana (Figure 1). It is bordered on the north by the Northern Cheyenne Indian Reservation and the town of Ashland, on the east by the Otter Creek drainage, on the south by the state of Wyoming, and on the west by the Crow Indian Reservation. The area includes portions of Big Horn, Powder River and Rosebud Counties, a part of the Custer National Forest and BLM land. Private ownership holds 69 percent of the land, Forest Service 17 percent, BLM 9 percent and the state 5 percent (Decker-Birney Resource Study 1973). The principal use of the area is for livestock production. The human population is approximately 1000. The communities within the area are Ashland, Birney, Decker, Kirby, Quietus and Otter.

Physiography

Important physical features within the area include the Tongue River, Rosebud Creek and Otter Creek drainages which generally dissect the region in a south/north direction, King Mountain, Poker Jim Butte, Wild Hog Butte and Horse Creek Butte which are situated in the northeastern part of the area, and the Tongue River Reservoir which is located in the southwestern portion of the unit. The lowest elevation, about 2,900 feet, is found adjacent to the Tongue River near Ashland, while the highest point of 4,300 feet, lies approximately 40 miles to the south along the Montana/Wyoming state line (Decker-Birney Resource Study 1973).

The surface geology is the Tongue River member of the Fort Union formation. It consists of nearly level bedded, weakly consolidated soft sandstones, silty sandstones, clayey shales and coalbeds. Large areas of the coalbeds have burned and the heat has baked and oxidized adjacent shale beds, resulting in brittle, reddish iron-oxide colored porcellanite (locally called scoria) and clinker beds. The Fort Union formation is of early Tertiary or Paleocene age, deposited about 60 to 80 million years ago. It was deposited by freshwater streams from highland sources to the west. Petrified trees, leaf fossils and shells of mollusks are common in some strata.

Terrace deposits of Quaternary age, one million to less than 25,000 years old, are common along major drainages. The soft shales and sandstone of the Fort Union formation are readily eroded in the semi-arid climate. This has resulted in intricately dissected plateau topography with a complex of high and intermediate bench levels. Common on the landscape are badlands, sandstone and shale escarpments and scoria buttes with highly irregular topography. South-facing slopes have, as a rule, more exposure of shale and sandstone, and a larger number of drainages. The overall area has a rough and broken topography with prominent high benches at several levels on the landscape.

Climate

The climate is characterized by cold winters and warm summers, with a frost-free period of approximately 105 days (U. S. Forest Service 1971). Mean annual precipitation is estimated at approximately 15 inches. May and June are normally the months of greatest precipitation.

RESULTS

Vegetation

The vegetation of the study area was divided into three major habitat types, then each of these types was further divided into subtypes (Table 1). The three broad vegetation/habitat types give an idea of the general type of ecosystem the wildlife species inhabit, but the subdivisions of each major habitat type give a more definitive aspect of wildlife requirements from season to season. In the next progress report these plant communities will be discussed in detail with a quantitative description of each. For now they will be briefly described qualitatively.

Table 1. Habitat types and subtypes.

<u>Ponderosa Pine Type</u>	<u>Grassland Type</u>	<u>Big Sage-Grassland Type</u>
<u>Subtypes</u>	<u>Subtypes</u>	<u>Subtypes</u>
Ponderosa Pine	Grassland	Big Sage-Grassland
Grassland Park	Big Sage-Grassland	Grassland
<i>Rhus</i> -Grass	<i>Rhus</i> -Grassland	Deciduous Shrub
Deciduous Shrub	Roadside	Silver Sage
Big Sage-Grassland	Alfalfa Field	Juniper
Ponderosa Pine-Juniper	Grain Field	Roadside Vegetation
Roadside Vegetation	Silver Sage	Alfalfa Field
Silver Sage	Pasture	Grain Field
Alfalfa Field		Pasture
Grain Field		Greasewood
Pasture		Ponderosa Pine
Snowberry Patch		Big Sage-Juniper
Ponderosa Pine-Juniper-		
Big Sage Mix		

According to the BLM (pers. comm.), 42 percent of the Birney-Decker area is covered with ponderosa pine (*Pinus ponderosa*) in varying densities, 31 percent big sagebrush (*Artemisia tridentata*), 26 percent grassland and 1 percent deciduous bottom.

The ponderosa pine habitat type is found around the edge of plateaus, extending down into coulee heads and along divides, especially north slopes. This type was divided into 13 subtypes.

Ponderosa Pine Subtype

The overstory is ponderosa pine varying from a dense canopy coverage with little understory to doghair thickets to extremely sparse, savannah-like coverage. Important shrubs are snowberry (*Symphoricarpos* spp.) and rose (*Rosa arkansana*) in the mesic coulee heads and skunkbush sumac (*Rhus trilobata*) which becomes more prevalent in the sparse pine stands. Major forbs include yarrow (*Achillea millefolium*), cudweed sage (*Artemisia ludoviciana*), several asters (*Aster* spp.) and scarlet gaura (*Gaura coccinea*). This type had one of the most varied forb composition of any type. The most common grasses are Idaho fescue (*Festuca idahoensis*), a sedge (*Carex* spp.), side-oats grama (*Bouteloua curtipendula*), needle and thread (*Stipa comata*), green needlegrass (*Stipa viridula*), bluebunch wheatgrass (*Agropyron spicatum*) and western wheatgrass (*Agropyron smithii*).

Grassland Park Subtype

The open parks within the pine forest occur on plateau tops and gently sloping sidehills. This type was as varied in floral composition as the ponderosa pine subtype. The only major shrub was skunkbush sumac. Rose was sparsely scattered throughout the type. Prevalent forbs are ragweed (*Ambrosia artemisiifolia*), yarrow, cudweed sage, aromatic aster (*Aster oblongifolius*), wild lettuce (*Lactuca serriola*), Hood's phlox (*Phlox hoodii*), scarlet globemallow (*Sphaeralcea coccinea*) and silverleaf scurfpea (*Psoralea argophylla*). The important grasses are western wheatgrass, Japanese chess brome (*Bromus japonicus*), downy chess brome (*Bromus tectorum*), sedge, bluegrasses (*Poa* spp.), green needlegrass, needle and thread and side-oats grama.

Rhus-Grass Subtype

This type was found on gentle-to-steep slopes. The only significant shrub is skunkbush sumac. Forbs were rather scarce except for occasional local concentrations. Ragweed and soapweed (*Yucca glauca*) were the pre-dominant forbs. The more prevalent grasses were downy chess brome, Japanese chess brome, side-oats grama, Idaho fescue and needle and thread.

Deciduous Shrub Subtype

Cottonwood (*Populus deltoides*) and green ash (*Fraxinus pennsylvanicus*) are the dominant trees. Serviceberry (*Amelanchier alnifolia*), snowberry and rose are the most prevalent shrubs with skunkbush and chokecherry (*Prunus virginiana*) being fairly common. Forbs and grasses vary with the type of creek bottom where most of this type is located.

Big Sagebrush-Grassland Subtype

This is a minor subtype often found on steep slopes. The dominant shrub is big sagebrush. Major forbs are fringed sagewort (*Artemisia frigida*),

Hood's phlox and snakeweed (*Gutierrezia sarothrae*). Prominent grasses are western wheatgrass, blue grama (*Bouteloua gracilis*), downy brome and Japanese brome.

Ponderosa Pine-Juniper Subtype

This type is often an ecotone between the ponderosa pine type and the big sage-grassland type. Rocky Mountain juniper (*Juniperus scopulorum*) grows on rough, rocky breaks down into the coulee bottoms. Various degrees of association exist between shrubs, forbs and grasses within this subtype. Within the ponderosa pine type, juniper is in association with and dominated by ponderosa pine. Understory plants are skunkbush, soapweed, Hood's phlox, asters, scarlet gaura, scarlet globemallow, bluebunch wheatgrass and green needlegrass. Further down the ridges and coulees, juniper gains in abundance and in places occurs as almost pure stands. Understory vegetation is sparse. At the lower end of this ecotone, juniper is found in association with big sagebrush and other species such as fringed sage, Hood's phlox, snakeweed, blue grama, western wheatgrass and bluebunch wheatgrass.

The limits of this ecotone are ill-defined due to patches of juniper occurring on favorable exposures extending up into the pine type or down into the sage-grassland.

Silver Sage Subtype

Areas of silver sage are usually linked to mesic sites such as floodplains, coulees and sidehill benches.

- - - - -

The remainder of the ponderosa pine habitat subtypes are self-explanatory by title.

The grassland habitat type occurs mainly on the tops of plateaus, and sometimes as part of valley floors. This type has been divided into eight subtypes.

Grassland Subtype

The major grass species are western wheatgrass, little bluestem (*Andropogon scoparius*), blue grama, Japanese brome, sedge, Idaho fescue, junegrass (*Koeleria cristata*), sandberg bluegrass (*Poa secunda*), needle and thread and green needlegrass. Some of the more common forbs are cudweed sage, scarlet globemallow, silverleaf scurfpea, yarrow, ragweed and pussytoes (*Antennaria parvifolia*). Rose was the only shrub of any significance.

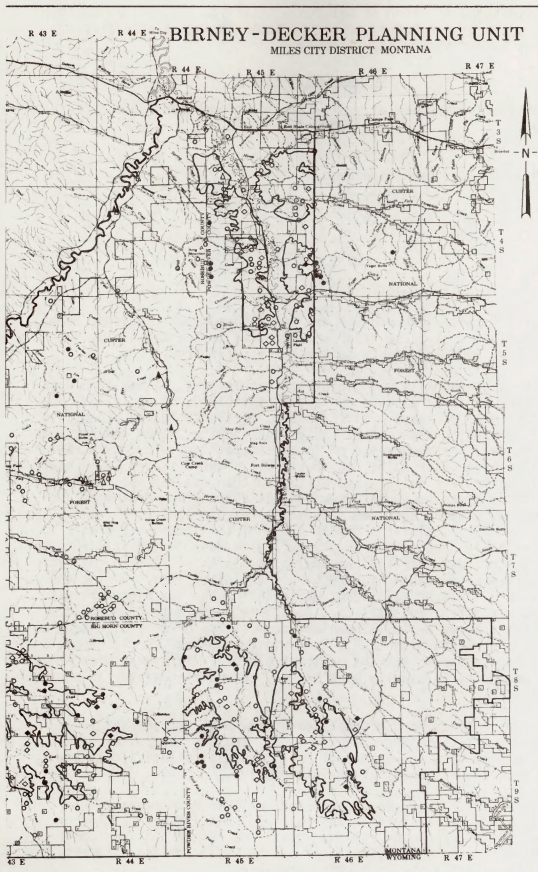
- - - - -

The rest of the subtypes have been described under the ponderosa pine subtypes.

The big sagebrush-grassland habitat type occurs mainly in the southern part of the Birney-Decker area at the head of Tongue River, Hanging Woman



Figure 2. Big game fall and winter distribution.



and Otter Creeks and the land in between. This type also occurs on the floodplains of major drainages and steep, south-facing, scoria slopes. This type has been divided into 12 subtypes.

Greasewood Subtype

This subtype is composed of small areas of greasewood (*Sarcobatus vermiculatus*).

- - - - -

The other subtypes have been described.

Big Game

Mule Deer

Distribution

Mule deer (*Odocoileus hemionus*) are found throughout the study area. The five potential coal lease areas were studied most intensively, so comments will be confined mainly to these areas (Figure 1).

Mule deer are generally not migratory in this area, as has been documented in other parts of eastern Montana (Mackie 1970, Dusek 1973). However, the Canyon Creek lease area (Figure 2, northwest lease) appears to be more of a wintering area and possibly "buck habitat" than general year-round deer range. The phenomenon of "buck habitat" or male concentration areas has also been observed by Mackie (1970) in the Missouri River breaks. Males appear to be less uniformly distributed than females and congregate in certain local areas. Canyon Creek and the surrounding drainages are rough topography and may suit the security needs of bucks more readily than adjacent areas. This, plus the probable use of this area as a winter range, is primarily based on three plane flights, one in the fall (October) and two in winter (December and January). In all three flights the ratio of males to females was much higher than in any other area. During the fall flight very few deer were seen, while during the two winter flights more deer were spotted, but still not enough to be sure that deer had moved into the area en masse. The plant communities of this site tend to strengthen the conviction that this is a wintering area. Rocky Mountain juniper and big sagebrush are the dominant plants by far, and this particular plant community is usually used heavily only during winter in southeastern Montana.

For the present the Canyon Creek lease area will be regarded as a wintering area, with some deer use during all seasons, and with certain areas of male concentrations; however, until more substantial data are collected, this conclusion will remain tentative.

In early fall (October) in the Ashland lease area (northeast lease) the majority of deer were seen in the valley of Otter Creek, either on agricultural fields or on the rolling grassland. After hunting season they had moved back into the pine cover of the Custer National Forest. This is at least partly due to hunting pressure.

During the winter (January), the majority of deer were in the ponderosa pine of the Custer Forest. At this time of year the alfalfa fields are not attracting deer into the valley, and there are often wind-blown bare slopes along the divides. Even though there was some movement to the valley floor to haystacks, deer were most often seen feeding in the ponderosa pine habitat type in small sagebrush flats or plateaus.

The other lease areas showed no particular distribution or seasonal movement. Figure 2 shows fall and winter distribution for mule deer, whitetails and antelope. The observation symbols represent groups of animals. For mule deer each circle may represent from 1 to 30 animals. Almost 1900 mule deer were classified in the last 6 months.

Use of Habitat Types

Ashland Lease Area

Fall: During this season I recorded 312 observations of mule deer, combined, from a pickup and an airplane. The relative use of habitat types can be seen from Table 2. The major type used is the grassland subtype of the major grassland habitat type. This percentage is probably higher than the actual use. There is always bias in trying to relate wildlife use to plant communities. Deer are usually observed early in the morning or in the evening when they are moving and feeding; therefore, most observations are associated with periods of activity.

Even though 37 percent of the mule deer were observed in the grassland subtype, they were moving from the alfalfa fields to the pine forest. Therefore, the actual use of the grassland was overrated and the alfalfa fields and pine forest use underrated. The use of the ponderosa pine type is most often underrated because this is the most difficult vegetation in which to see deer. However, over a period of time with enough observations, the real use of the various habitat types becomes apparent.

The ponderosa pine subtype within the ponderosa habitat type is the second most used type with 17 percent of the observations. This was followed by 14 percent use of the big sage-grassland subtype of the big sage-grassland habitat type. Deer are still found throughout many other types, as can be seen from Table 2, but as winter approaches they form groups and concentrate on fewer habitat types.

Winter: As can be seen from Table 2, all of the mule deer observations are in the ponderosa pine habitat type. Seventy-nine percent were in the ponderosa pine subtype, 15 percent in silver sage patches and 5 percent in the ponderosa pine-juniper subtype.

Table 2. Percent of seasonal use of habitat types in the Ashland lease area by mule deer from 390 ground and aerial observations.

Habitat Types	Fall (312) ^{1/}	Winter (78)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	17 ^{2/}	79
Grassland Park Subtype	7	-
Deciduous Shrub Subtype	8	-
Ponderosa Pine-Juniper Subtype	3	5
Silver Sage Subtype	-	15
Alfalfa Field Subtype	5	-
Grassland Habitat Type		
Grassland Subtype	37	-
<i>Rhus</i> -Grassland Subtype	Tr ^{3/}	-
Pasture Subtype	3	-
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	14	-
Deciduous Shrub Subtype	3	-
Silver Sage Subtype	3	-
Alfalfa Field Subtype	1	-
^{1/} Sample size for the season ^{2/} Percent of the seasonal observations ^{3/} Trace - less than 1 percent of seasonal observations		

Upper Otter Creek Lease Area

Fall: The greatest number of observations (38 percent) were recorded for mule deer in the open big sage-grassland subtype of the big sage-grassland habitat type which occupies approximately 40-45 percent of this lease area.

It is important to know the percentage of an area covered by the various plant communities in order to see if the majority of deer are indeed favoring a certain vegetation type or simply distributed evenly among the various types in accordance with their abundance. This will be looked at more closely in later reports.

The ponderosa pine subtype of the ponderosa pine type received 16 percent of the mule deer use. This is followed by 11 percent use of the big sage-grassland openings within the ponderosa pine forest. If this 11 percent is combined with the 38 percent use of rolling big sage-grassland hills, this comes to 49 percent of the mule deer use being on the big sage-grassland (Table 3).

Winter: For this season, 39 percent of the mule deer observations were in the big sage-grassland subtype of the big sage-grassland type, about the same as in the fall. If this is coupled with 7 percent use of the big sage-grassland openings within the ponderosa pine type, this comes to 46 percent, about 3 percent less use of this type than in the fall. The use of the ponderosa pine subtype of the ponderosa pine type is 17 percent, about the same as in the fall. However, the use of the ponderosa pine subtype within the big sage-grassland type - in other words, the patches of timbered ridges on the rolling sagebrush hills - rose from 1 percent in the fall to 22 percent. Combining these two timber subtypes yields 39 percent of all the observations for this season. Evidently, the ponderosa pine is important for shelter, especially during winter months.

Table 3. Seasonal use of habitat types in the Upper Otter Creek lease area by mule deer from 435 ground and aerial observations.

Habitat Types	Fall (283) ^{1/}	Winter (152)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	16 ^{2/}	17
Grassland Park Subtype	7	7
Deciduous Shrub Subtype	2	-
Big Sage-Grassland Subtype	11	7
Silver Sage Subtype	-	8
Alfalfa Field Subtype	10	-
Grassland Habitat Type		
Grassland Subtype	6	-
Pasture Subtype	6	-
Big Sage-Grassland Habitat Type		
Big Sage-Grassland	38	39
Deciduous Shrub Subtype	1	-
Silver Sage Subtype	2	-
Ponderosa Pine Subtype	1	22

^{1/} Number of deer observed

^{2/} Percentage of seasonal observations

Hanging Woman Lease Area

Fall: Thirty-four percent of the observations were in the big sage-grassland subtype of the big sage-grassland habitat type (Table 4). This was followed by 18 percent of the observations in the big sage-grassland openings of the ponderosa pine type. Together they represent 52 percent of all the observations. Eighteen percent of the observations were also located in the deciduous shrub subtype (creek bottom) of the big sage-grassland type. This is high, compared to other areas.

This may be due to the fact that the creek bottoms offer a certain measure of cover and some preferred food items in an area otherwise composed of sagebrush prairie.

Winter: Fifty-one percent of the observations for this season were in the big sage-grassland subtype of the big sage-grassland type. Fifteen percent of the observations were in the big sage-grassland openings of the ponderosa pine type. Together these two total 66 percent of all the mule deer sighted this season. The ponderosa pine subtype of the ponderosa pine type accounted for 12 percent of the observations. This increased from 6 percent in the fall. The ponderosa pine subtype of the big sage-grassland type accounted for 18 percent of the observations. This subtype contained only 1 percent of the observations in the fall. In other words, the use of these two timbered subtypes increased from a total of 7 percent in the fall to 30 percent in the winter. This compares quite favorably with a similar increase in the Upper Otter Creek lease area. Probably this movement to timbered areas is to find shelter from the cold.

Table 4. Seasonal use of habitat types in the Hanging Woman lease area by mule deer from 322 ground and aerial observations

Habitat Types	Fall (145) ^{1/}	Winter (177)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	62 ^{2/}	12
Big Sage-Grassland Subtype	18	15
Ponderosa Pine-Juniper	1	4
Grassland Habitat Type		
Grassland Subtype	1	-
Big Sage-Grassland Habitat Type		
Big Sage-Grassland	34	51
Grassland Subtype	14	-
Deciduous Shrub Subtype	18	-
Silver Sage Subtype	1	-
Alfalfa Field Subtype	2	-
Greasewood Subtype	3	-
Ponderosa Pine Subtype	1	18

^{1/} Number of deer observed

^{2/} Percentage of seasonal observations

Decker Lease Area

Fall: Seventy-nine percent of the mule deer observations in this lease area were recorded for the big sage-grassland subtype of the big sage-grassland type (Table 5). This appears only normal, since the entire area is virtually big sage-grassland prairie. The deciduous shrub type accounted for 10 percent of the observations.

Winter: The use of the big sage-grassland subtype declined during this season to 62 percent. Use of the silver sage subtype comprised 10 percent of the observations. This illustrates the importance of silver sage as a winter food, even though its distribution is mostly restricted to floodplains and similar mesic sites.

Table 5. Seasonal use of habitat types in the Decker lease area by mule deer from 419 ground and aerial observations.

Habitat Types	Fall (139) ^{1/}	Winter (280)
Ponderosa Pine Habitat Type		
Big Sage-Grassland	-	2
Grassland Habitat Type		
Grassland Subtype	-	3
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	79 ^{2/}	62
Deciduous Shrub Subtype	10	-
Silver Sage Subtype	-	10
Juniper Subtype	5	7
Roadside Vegetation	-	13
Grain Field	6	-
Big Sage-Juniper Mix	-	2

^{1/} Number of deer observed

^{2/} Percentage of seasonal observations

Canyon Creek Lease Area

Fall: Not many deer were observed in this lease area during this season; therefore, the habitat use is based on a small sample of 32. Twenty-five percent of these observations were in the ponderosa pine-juniper-sagebrush mix subtype of the ponderosa pine type (Table 6).

This is generally an open pine and juniper canopy with big sage filling the open areas. This subtype covers the ridges and sidehills. It is also of interest to note that 12 percent of the observations were in the grassland subtype of the grassland type, which is the plateau tops, 12 percent were in the *Rhus*-grassland subtype and 3 percent in the grassland subtype - both of these within the ponderosa pine type. These three last subtypes account for 27 percent of the observations; therefore, approximately one-fourth of the deer use is in some type of grassland plant community.

Winter: During winter more deer were seen in this area, with 65 percent being observed in the ponderosa pine-juniper subtype of the ponderosa pine type. Another 31 percent were in the ponderosa pine subtype of the ponderosa pine habitat type. Therefore, 96 percent of the mule deer were using a timber type during this season. This is the same trend as noted in other lease areas.

Table 6. Seasonal use of habitat types in the Canyon Creek lease area by mule deer from 243 ground and aerial observations.

Habitat Types	Fall (32) ^{1/}	Winter (211)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	12 ^{2/}	31
Grassland Park Subtype	3	3
<i>Rhus</i> -Grassland Subtype	12	-
Deciduous Shrub Subtype	-	1
Big Sage-Grassland Subtype	3	-
Ponderosa Pine-Juniper	-	65
Alfalfa Field	12	-
Pasture	19	-
Ponderosa Pine-Juniper-Big Sage Mix	25	-
Grassland Habitat Type		
Grassland Subtype	12	-

^{1/} Number of deer observed

^{2/} Percentage of seasonal observations

Custer National Forest

Some observations were made on the forest during the fall (Table 7). The biggest use of any plant community was in the ponderosa pine subtype of the ponderosa pine habitat type, which accounted for 33 percent of the observations. This was followed by 13 percent of the observations in the

grassland subtype of the big sage-grassland type. Mule deer were seen in many other vegetation types, but in no great quantity.

No observations were made during winter.

Table 7. Seasonal use of habitat types on the Custer National Forest by mule deer from 88 ground and aerial observations.

Habitat Types	Fall (88)1/
Ponderosa Pine Habitat Type	
Ponderosa Pine Subtype	332/
Grassland Park Subtype	2
<i>Rhus</i> -Grassland Subtype	1
Deciduous Shrub Subtype	1
Big Sage-Grassland Subtype	6
Ponderosa Pine-Juniper	6
Roadside Vegetation	1
Alfalfa Field	10
Pasture	2
Grassland Habitat Type	
Grassland Subtype	7
Big Sage-Grassland Habitat Type	
Big Sage-Grassland Subtype	8
Grassland Subtype	13
Alfalfa Field	8
Greasewood Subtype	2
1/ Number of deer observed	
2/ Percentage of seasonal observations	

Seasonal Use of Topography

The type of topography deer were observed on was divided into plateaus, coulees, ridgetops, sidehills and flats. A flat could be anything from a wide valley floor to a wide divide.

Fall

During this season, flat terrain accounted for 63 percent of the mule deer observations. Sidehills were second in use, comprising 19 percent of the observations (Table 8).

Winter

During this season, the trend was reversed. Use of the plateaus increased to 35 percent, sidehills to 33 percent and flats decreased to 24 percent. This pattern is at least partially related to snow depth. Deer move to higher elevations to get away from the deeper snow of the lowland and feed on the sidehills and plateaus.

Table 8. Mule deer seasonal use of topography (748 observations)

	<u>Plateau</u>	<u>Flat</u>	<u>Coulee</u>	<u>Sidehill</u>	<u>Ridgetop</u>	<u>Creek</u>
Fall	31/	63	14	19	1	-
Winter	35	24	6	33	2	1

1/ Percent of seasonal use

Mule Deer Activity and Use of Exposures

Fall

Over one-third of the deer observed were standing, one fourth running and one-fifth feeding (Table 9). This classifying of behavior is very biased, since these deer are being observed during their most active times of day. Many times the deer have observed the observer first and their behavior has changed.

Almost one-third of the deer observations were on north exposures. This was followed by east exposures. North, northeast and east exposures accounted for 64 percent of the observations.

Winter

One third of the deer were observed standing. This was followed by one-third of the deer observed being bedded. Very few deer were observed feeding. This change is more a function of time of day rather than season. Deer are generally more observable throughout the day in winter, and more time is spent looking for them.

Forty-five percent of the deer classified as to slope were on east exposures. North and west exposures each yielded 21 percent of the observations. Fifty-nine percent of the deer were seen on east or southeast exposures. This does show a trend toward the warmer exposures. These observations are similar to Dusek (1973) and Martin (1975).

Table 9. Mule deer activities (906 observations) and use of exposures (119 observations).

	Fall	Winter
Standing	36 ^{1/}	32
Bedded	3	32
Running	27	15
Feeding	19	8
Walking	16	7
N	31	21
S	3	-
E	18	45
W	15	21
NE	15	-
SE	3	14
NW	8	-
SW	7	-

^{1/} Percent of seasonal use

Food Habits

Some food habits data have been collected for the Birney-Decker area, but at this time have not been analyzed for incorporation in this report. However, food habits of mule deer were investigated by this author in 1970 and 1971 on a section of the Custer National Forest which is included in the Birney-Decker unit. Mule deer rumens were also collected from hunters during the fall of 1973 on the Custer Forest. Data from rumens collected around Colstrip have also been included.

Fall

In September, skunkbush and dandelion (*Taraxacum* spp.) made up the bulk of the diet. In October, skunkbush and snowberry comprised 59 percent of the diet and in November they comprised 34 percent. The November rumens also contained 8 percent silver sagebrush. Alfalfa made up 7 percent of the November food habits, and mushrooms made up 6 percent (Table 10).

Winter

By January the mule deer diet consisted strictly of shrubs. Silver sagebrush and skunkbush were predominant. In February big sagebrush and rubber rabbitbrush (*Chrysothamnus nauseosus*) totaled 86 percent of the diet (Table 10).

Table 10. Fall and winter food habits of mule deer within the Birney-Decker unit.

	September 3 Sites(152) ^{1/} (Knapp 1972)	Oct.(31 Rumens) (Field Data 1973)	November 17 Rumens (Field Data '73)	January 2 Sites(131) (Knapp 1972)	February 4 Sites(2084) (Knapp 1972)
SHRUBS					
<i>Artemisia cana</i>		1	8	35	2
<i>Artemisia tridentata</i>					38
<i>Chrysothamnus nauseosus</i>		2	2		48
<i>Juniperus scopulorum</i>			3	4	2
<i>Pinus ponderosa</i>		Tr	12		
<i>Rosa arkanisana</i>		1			
<i>Rhus trilobata</i>	64	36	21	50	12
<i>Symphoricarpos</i> spp.		23	13		
Unidentified shrubs		4	5		
Total Shrubs	64	67	52	101	102
FORBS					
<i>Artemisia frigida</i>	2				
<i>Aster oblongifolius</i>		2			
<i>Aster</i> spp.		1	2		
<i>Cirsium undulatum</i>		1	2		
COMPOSITAE		1	2		
<i>Medicago sativa</i>		8	7		
Mushroom		3	6		
<i>Senecio canus</i>					
RANUNCULACEAE					
<i>Taraxacum</i> spp.	33				
<i>Tragopogon dubius</i>			2		
<i>Yucca glauca</i>		1	1		Tr
Unidentified Forbs		10	17		
Total Forbs	35	27	39	-	Tr
GRAMINEAE	-	3	5	-	-

^{1/}Instances of use ,(bites)

Population Characteristics

Ashland Lease Area

Fall: This area appears to have about an average fawn:doe ratio of 55 fawns per 100 does. Mackie (1972) felt that 50 to 55 fawns per 100 does would maintain a stable population in the Missouri River breaks.

The male:female ratio is very good, with one male for every four females. This is more than enough males to ensure breeding of all receptive females. The breeding season is approximately a month long (Taylor 1956) which allows a mature buck to successfully breed about 30 does.

Winter: The winter ratio is 55 fawns per 100 adults. Fawn to adult ratios are used because males are losing antlers and cannot be readily distinguished.

Upper Otter Creek Lease Area

Fall: The ratio for this area is 62 fawns per 100 does, which is somewhat better than lower Otter Creek (Ashland). The areas are about 20 miles apart. However, the adult ratio is only 12 males per 100 females, about half the Ashland ratio. It appears to be enough for breeding.

Winter: The production ratio is 78 fawns per 100 does which is good. The only question is why should this ratio be higher than the fawn:doe since bucks are included? Actually, very few bucks were seen, and there appeared to be a preponderance of fawns observed. There are a couple of factors that could account for this. Since this ratio was calculated after the hunting season, the fawn:adult ratio might very well increase, as the majority of deer shot are adults. There is probably some observer error when classifying these deer because by winter the fawns are good size and can be mistaken for yearlings, especially from an airplane. These ratios are only estimates and can be influenced to unknown degrees by several factors.

Hanging Woman Lease Area

Fall: This area had almost the same production figures as Ashland. There were 58 fawns per 100 does and 26 males per 100 females.

Winter: The winter ratio was 61 fawns per 100 adults.

Decker Lease Area

Fall: Decker's ratio was 52 fawns per 100 does and 17 males per 100 females.

Winter: This ratio of 81 fawns per 100 adults is very good, but much higher than the fall ratio. It may be that this heavy sagebrush area is a wintering ground and thereby has an influx of does and fawns this time of year. This hypothesis will have to be carefully looked at by monitoring of this area for at least another year.

Canyon Creek Lease Area

Fall: So few deer were observed during the fall that no ratios could be established.

Winter: The production ratio was low, with 44 fawns per 100 adults. Part of the reason for this low ratio was the abundance of male deer. From what could be identified with surety as bucks and does, the ratio was 100:100. As discussed earlier, this area appears to be heavily used by bucks and inhabited only sparsely by does and fawns.

Custer National Forest

The forest, at least the section west of O'Dell Creek, has had low fawn:doe ratios for several years. From the small sample obtained on the forest, the ratio is 32 fawns per 100 does.

Harvest Data

The Birney-Decker area contains all of hunting district 742 and about half of 740. In hunting district 742, 1,980 mule deer were harvested in 1973. The hunter success was about 73 percent. Nine hundred and sixty-four deer were harvested from hunting district 740. Hunter success was about 62 percent. The 1974 harvest has not been released as yet.

Mule deer jaws were collected from hunters on the Custer National Forest in the fall of 1974. The age and sex composition was as follows:

	<u>Males</u>	<u>Fawns</u>	<u>Females</u>
1-1/2	18	1	8
2-1/2	8		4
3-1/2	7		3
4-1/2	4		2
5-1/2	-		2
6-1/2 - 7-1/2	-		1
7-1/2 - 8-1/2	1		

Hunters usually prefer to take males, and it is obvious that yearlings are most susceptible to hunters.

White-Tailed Deer

Since 1941, white-tailed deer (*Odocoileus virginianus*) have gradually extended their range over most of the state of Montana. East of the continental divide, whitetails have become common along bottom lands and most major rivers and streams (Figure 2). They are usually associated with deciduous vegetation along drainages, often close to agriculture (Allen 1971).

Use of Habitat Types

Due to the small sample, whitetail observations will not be divided into lease areas.

Fall: Thirty-nine percent of this season's observations were in the deciduous shrub subtype of the ponderosa pine type. This is as would be expected, since whitetails mainly inhabit bottomlands and drainageways. The next most used subtype was alfalfa fields. Whitetails utilize alfalfa fields and haystacks to a much greater extent than mule deer. Twenty-two percent of the observations were in the ponderosa pine subtype of the ponderosa pine habitat type. The very adaptable whitetail is obviously making substantial use of the upland timber type.

Winter: Eighty-seven percent of the observations were in the deciduous shrub type of the ponderosa pine type. During winter, whitetails have a greater tendency to "yard up" than mule deer, and occupy relatively small areas of bottomland. The rest of the observations were in the ponderosa pine subtype.

Table 11. Seasonal habitat use of white-tailed deer from 124 ground and aerial observations.

Habitat Type	Fall (36)	Winter (88)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	22 ^{1/}	11
Deciduous Shrub Subtype	39	87
Alfalfa Field	28	-
Big Sage-Grassland Habitat Type		
Deciduous Shrub	3	-
Alfalfa Field	8	-

^{1/} Percent of observations

Activity and Use of Slope

Fall: Eighty-nine percent of the observations were of deer standing, and only 11 percent feeding. Fifty-two percent of the whitetails were on hillsides. The sample size was small, and this slope is probably over-represented. Twenty-nine percent of the observations were on flat ground.

Winter: Fifty-four percent of the deer were observed standing, 19 percent feeding, 14 percent walking and 13 percent bedded. During this season, 87 percent of the deer were observed on flat ground, with only 13 percent on hillsides.

Table 12. Seasonal activity and use of slope by white-tailed deer from 105 and 108 observations, respectively.

	Fall	Winter
Standing	89 ^{1/}	54
Feeding	11	19
Walking	-	14
Bedded	-	13
Hillside	52	13
Flat	29	87
Creek	19	-

^{1/} Percent of seasonal activity or use

Food Habits

Some food habits investigations for this area are presently under way and will be discussed in a later report.

Stomach samples from whitetails collected from the Missouri River bottomlands showed that browse was the most important forage during all seasons except summer. Preferred browse plants included chokecherry, serviceberry, skunkbush sumac and snowberry. Other browse plants include wild rose, green rabbitbrush (*Chrysothamnus viscidiflorus*), greasewood, buffalo berry (*Shepherdia argentea*), and various species of sagebrush. Western snowberry was the single most important plant in the yearlong diet. Alfalfa and grain were important when available (Allen 1971).

Three whitetail rumens were collected from hunters in the fall of 1973. Two were from Colstrip and one from the Holiday Springs campground of the Custer National Forest. One of the Colstrip rumens contained 79 percent snowberry, with grass comprising another 14 percent. In the other Colstrip rumen, snowberry made up 44 percent of the diet. Skunkbush was second, comprising 33 percent and unidentified browse third, with 16 percent. From the Custer National Forest rumen, snowberry made up 36 percent of the diet and alfalfa 35 percent. This was followed by mushroom, comprising 12 percent of the sample. These three samples enforce Allen's (1971) statement that snowberry is an important browse species for whitetail.

Population Characteristics

Whitetail productivity is rated as excellent in southeastern Montana, and it has been improving steadily for the last several years. In general, the fawn per adult ratio has been increasing steadily from a ratio of 55 fawns per 100 adults in 1969 to 122 fawns per 100 adults in 1973 (Eustace 1974).

Harvest Data

In hunting district 742, 89 whitetails were harvested in 1973. In district 740, 34 whitetails were harvested. For southeastern Montana in general, total whitetails account for almost 20 percent of the deer harvest. While the number of whitetails harvested has been increasing, the proportion they represent in the total harvest has not increased because the mule deer harvest has been growing proportionately.

Pronghorn Antelope

Antelope (*Antilocapra americana*) populations fluctuated greatly during settlement in Montana. Antelope dwindled to about 3,000 in 44 areas of central and southwestern Montana by 1924. While some antelope were taken for food by homesteaders, the alteration of native prairie to cultivated farmlands was another reason for the population low. With the drought of the 1930's, homesteaders left by the hundreds. The abandoned cultivated fields gradually reverted back to vegetation more favorable to antelope. With the additional food and space, antelope populations steadily increased with only temporary setbacks due to severe winters in 1948-49 and 1964-65. After the 1930's antelope population estimates went from 10,000 in 1937 to about 75,000 in 1965 (Compton et al. 1971).

Over 1400 antelope were classified in the last 6 months. Their fall and winter distribution are in Figure 2. Some antelope leave the study area entirely, but where they go is unknown.

Use of Habitat Types

Ashland Lease Area

Fall: Forty-nine percent of the antelope observations were in the big sage-grassland subtype of the big sage-grassland habitat type (Table 13). This was followed by 28 percent of the observations in the grassland subtype of the grassland habitat type. These open terrain types account for 77 percent of the observations. The big sage-grassland subtype of the ponderosa pine type contained 16 percent of the observations. If this subtype is combined with the same subtype in the major big sage-grassland type, they account for almost two-thirds of the observations. In other words, 65 percent of the observations were connected with sagebrush terrain.

Winter: Only 30 antelope were observed during this season and they were on the big sage-grassland subtype of the ponderosa pine type.

Table 13. Seasonal habitat use by antelope on the Ashland lease area from 202 ground and aerial observations.

Habitat Type	Fall (172)	Winter (30)
Ponderosa Pine Habitat Type		
Big Sage-Grassland Subtype	16 ^{1/}	100
Grassland Habitat Type		
Grassland Subtype	28	-
Grain Field	1	-
Pasture	5	-
Big Sage-Grassland Habitat		
Big Sage-Grassland	49	-
Grassland	1	-

^{1/} Percent of seasonal use

Upper Otter Creek Lease Area

Fall: In this area the biggest concentrations of antelope (38 percent) were on alfalfa fields within the big sage-grassland habitat type. This was closely followed by 33 percent use of the big sage-grassland subtype within the same type. The big sage-grassland subtype within the ponderosa pine type accounted for 22 percent of the observations. Combining the same subtypes yields a total of 55 percent of the antelope use on sagebrush terrain (Table 14).

Winter: Ninety-two percent of the observations were in the big sage-grassland subtype of the big sage-grassland habitat type. The other 8 percent was in the ponderosa pine subtype of the ponderosa pine habitat type.

Table 14. Seasonal habitat use by antelope on the Upper Otter Creek lease area from 363 ground and aerial observations.

Habitat Type	Fall (216)	Winter (147)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	5 ^{1/}	8
Big Sage-Grassland Subtype	22	-
Alfalfa Field Subtype	Tr	-
Grassland Habitat Type		
Grassland Subtype	2	-
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	33	92
Alfalfa Field Subtype	38	-

^{1/} Percent of seasonal use

Hanging Woman Lease Area

Fall: Ninety-five percent of the observations were in the big sage-grassland subtype of the big sage-grassland habitat type. This is expected since this area is almost completely sagebrush-grassland.

Winter: The big sage-grassland subtype of the big sage-grassland type comprised 100 percent of the observations (Table 15).

Table 15. Seasonal use of habitat types by antelope on the Hanging Woman lease area from 649 ground and aerial observations.

Habitat Type	Fall (463)	Winter (186)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	31/	-
Grassland Subtype	2	-
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	95	100
Grassland Subtype	1	-

1/ Percent of seasonal use

Decker Lease Area

Fall: Sixty-eight percent of the observations were in the big sage-grassland subtype of the big sage-grassland habitat type. This was followed by 21 percent found in grain fields of the same major type (Table 16).

Winter: All the observations were in the big sage-grassland subtype of big sage-grassland habitat type.

Table 16. Seasonal use of habitat types by antelope in the Decker lease area from 187 ground and aerial observations.

Habitat Type	Fall (96)	Winter (91)
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	681/	100
Alfalfa Field	3	-
Grain Field	21	-
Pasture Subtype	7	-
Big Sage-Juniper Subtype	1	-

1/ Percent of seasonal use

Canyon Creek Lease Area

The Canyon Creek area has very little suitable antelope habitat. In the fall only 12 antelope were seen and they were in the big sage-grassland subtype. In the winter 47 antelope were seen and 57 percent were in the big sage-grassland subtype and 43 percent in the ponderosa pine subtype of the ponderosa pine type.

Custer National Forest

In the fall 20 antelope were observed. Forty-five percent were observed on the grassland subtype of the grassland habitat type. Another 20 percent were on the grassland subtype of the big sage-grassland type. The grassland flats of the forest appear to furnish summer and early fall range for antelope, but they go elsewhere for winter.

Activity and Use of Topography

Fall: Forty percent of the antelope observed were feeding. This was closely followed by 37 percent of the animals running. Usually antelope would begin to run as soon as they saw the airplane. Standing antelope represented 16 percent of the total.

Seventy-three percent of the animals were observed on flats. Add to this 18 percent found on plateaus, and this equals 91 percent of the observations being on level ground.

Winter: During this season seventy-eight percent of the animals observed were running and 12 percent were feeding. All animals were on level ground.

Table 17. Seasonal activity and topography use by antelope.

Activity: 621 Observations

	Run	Walk	Stand	Bedded	Feeding
Fall	37 ^{1/}	5	16	2	40
Winter	78	-	10	-	12

Topography: 472 Observations

	Creek	Plateau	Flat	Hilltop	Sidehill
Fall	3	18	73	Tr	6
Winter	-	26	74	-	-

^{1/} Percent of seasonal use or activity

Food Habits

No antelope food habits data have been collected in the Birney-Decker area; however, such food habits have been well documented in several other areas of eastern Montana. Since the various studies results have been very similar, data collected around Colstrip in the fall of 1973 and winter data from Bayless (1969) will be utilized.

During fall, forb use was about 35 percent of the total forage consumed. Important forbs were alfalfa (*Medicago sativa*), three-leaved milkvetch (*Astragalus gilviflorus*), fringed sagewort and Nuttall goldenweed (*Haplopappus nuttallii*). The single most important shrub was silver sagebrush. It is interesting to note the heavy use of snowberry in the October samples.

During winter the antelope's diet is almost entirely shrubs, which comprise 93 percent of the food taken. The species consumed consist of big sagebrush and silver sagebrush. The remainder of the diet was mostly fringed sagewort. This is strong evidence of the importance of sagebrush to antelope.

Production

An antelope survey was flown during the summer of 1974. In hunting district 742 production was 56 fawns per 100 does, 44 males per 100 females and 39 fawns per 100 adults. Density was almost 1 antelope for every 2 square miles.

In hunting district 740, production was 56 fawns per 100 does, 38 males per 100 females and 40 fawns per 100 adults. Density was 1 antelope per 2 square miles.

Harvest

In 1974, 18,811 antelope were harvested in Montana. Of this total 8,380 were shot in eastern and southeastern Montana. In hunting district 742, 200 antelope were taken. One hundred and twenty-three were males, 65 females and 12 fawns. Hunter success was about 69 percent. It took an average of 5 days for a hunter to get his antelope in this district.

In hunting district 740, about 70 antelope were harvested. Of the 70, 43 were males, 21 females and the rest unclassified. It took an average of 6 days to get an antelope and hunter success was only 52 percent.

Table 18. Fall and winter food habits of antelope.

	Sept. (3) ^{1/} Rumens	Oct. (9) Rumens	Nov. (1) Rumen	Jan. (9) ^{2/}	Feb. (12)
Taxa					
Shrubs:					
<i>Artemisia cana</i>	1	35	46	19	4
<i>Artemisia tridentata</i>	Tr	1		76	79
<i>Chrysothamnus nauseosus</i>	3	1			3
<i>Rosa arkanisana</i>	11	1			
<i>Sarcobatus vermiculatus</i>	10				
<i>Symphoricarpos</i> spp.		21			
Unidentified Shrubs		14			
Total Shrubs	25	73	46	95	86
Forbs:					
<i>Antennaria parvifolia</i>		3			
<i>Artemisia frigida</i>	8		6	Tr	11
<i>Artemisia longifolia</i>	Tr				
<i>Aster</i> spp.	3			2	
<i>Astragalus gilviflorus</i>	6				
<i>Comandra umbellata</i>	Tr				
<i>Haploppapus nuttallii</i>	9				
<i>Medicago sativa</i>	45				
<i>Opuntia polycantha</i>		4			
<i>Tragopogon dubius</i>	1				
Unidentified Forbs		9	48		
Other Forbs (15)	1	4			
Total Forbs	74	20	54	3	11
GRAMINEAE	Tr	7		Tr	2

^{1/} Paunch samples^{2/} Number of separate feeding sites

Small Game

Sharp-Tailed Grouse

The sharp-tailed grouse (*Pedioecetes phasianellus*) is native to Montana. The Great Plains sharptail remains seasonally abundant in the less dry upland areas of eastern and central Montana where mixed prairie/rangelands have been maintained in reasonably good condition. During high populations, sharptails extend their range into the marginal islands of native grasslands, usually along drainages surrounded by wheat, barley or summer fallow. Conversely, during low populations, sharptails are more restricted around the upper limits of drainages with the best stands of intermixed tree-shrub-grasslands (Brown 1971). Four hundred and thirty-eight sharptails were classified during the 6 months of this report. Figure 3 shows fall and winter distributions.

Use of Habitat Types

Fall: Sharptails were spread out over several habitat types during this season. The ponderosa pine subtype of the ponderosa pine habitat type accounted for 17 percent of the observations. This was closely followed by use of pastures (16 percent) within the pine habitat type. Alfalfa fields within the big sage-grassland type accounted for 15 percent of the observations and the big sage-grassland subtype accounted for 12 percent. Alfalfa fields in the ponderosa pine type comprised 11 percent of the observations. Combine this with the alfalfa fields in the big sage-grassland type and alfalfa fields make up 26 percent of the apparent habitat use.

Winter: The ponderosa pine subtype accounted for 45 percent of the observations during this season. Obviously the shelter of the pine forest is highly desirable during the winter months. Thirteen percent of the observations were in the big sage-grassland subtype of the big sage-grassland habitat type. Eighty-eight percent of all the observations were in some subtype of the ponderosa pine type, as opposed to 47 percent during the fall.

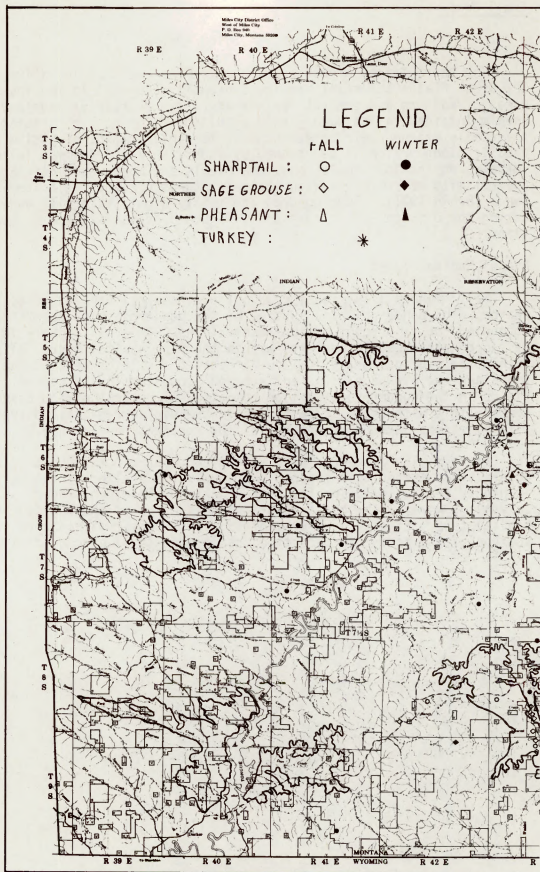


Figure 3. Small game fall and winter distribution.

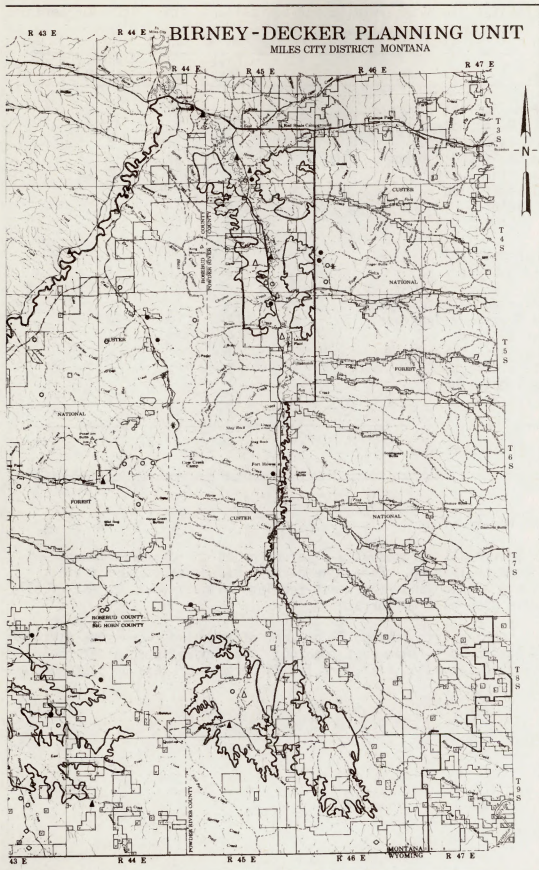


Table 19. Habitat use by sharptails during fall and winter from 438 aerial and ground observations.

Habitat Type	Fall (182)	Winter (256)
Ponderosa Pine Habitat Type		
Ponderosa Pine Subtype	17 ^{1/}	45
Grassland Park Subtype	1	2
Big Sage-Grassland Subtype	1	9
Ponderosa Pine-Juniper	1	4
Roadside Vegetation	-	18
Alfalfa Field	11	5
Pasture Subtype	16	-
Grassland Habitat Type		
Grassland Subtype	9	4
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	12	13
Grassland Subtype	4	-
Deciduous Shrub Subtype	1	-
Silver Sage Subtype	5	-
Roadside Vegetation	7	-
Alfalfa Field	15	-

^{1/} Percent of seasonal use

Activity and Use of Slope

Fall: Sharptails were usually observed doing one of three things - flying, walking or feeding. Forty-one percent of the birds were flying, 31 percent were walking and 26 percent feeding. Ninety-four percent of all the birds were seen on flat terrain.

Winter: During this season, 72 percent of the birds were seen flying, 13 percent roosting and 12 percent feeding. One hundred percent of the sharptails were observed on flat terrain, 74 percent of this on plateaus.

Table 20. Activity and use of topography by sharptails during fall and winter.

Activity: 324 Observations

	<u>Walk</u>	<u>Fly</u>	<u>Stand</u>	<u>Feed</u>	<u>Roosting</u>
Fall	31 ^{1/}	41	1	26	1
Winter	-	72	3	12	13

Topography Use: 268 Observations

	<u>Plateau</u>	<u>Flat</u>	<u>Hillside</u>	<u>Meadow</u>
Fall	27	51	6	16
Winter	74	26	-	-

^{1/} Percent of activity or seasonal use.

Food Habits

Food habits of sharptails are quite varied. In a study conducted in Canada (Pepper 1972), approximately 27 different species of plants and animals were consumed. The most important species eaten were wheat (*Triticum aestivum*), dandelion leaves, barley (*Hordeum vulgare*), oats (*Avena sativa*), black bindweed (*Polygonum convolvulus*) seeds, wood's rose (*Rosa woodsii*), western snowberry, grass leaves and fringed sagewort leaves.

From a study in South Dakota (Hillman and Jackson 1973), cultivated crops were first in importance for summer, fall and winter. Grasshoppers were the most important insects during summer, fall and winter.

A few sharptail crops were collected in Rosebud County during the fall and winter of 1973-74. More were collected last fall and winter, but have not been analyzed. Of the two crops from birds killed in the fall, one was mainly full of ponderosa pine seeds and some skunkbush berries. The other crop was half full of grass. An unidentified plant composed one-third of the contents of this second crop and dandelion comprised 16 percent of this bird's recent diet.

Five sharptail crops were obtained during the winter of 1974. One was empty and two others had very little in them, but what was there was mainly green grass. A fourth crop was completely skunkbush berries. The last crop had about 20 percent skunkbush berries and rosehips and 80 percent galls from big sagebrush plants (Table 21).

Table 21. Fall and winter food habits of sharp-tailed grouse from seven crops.

	Fall		Winter				
	#1	#2	#1	#2	#3	#4	#5
Green Grass	-	50 ^{1/}	-	100	100	-	-
Galls on Big Sage	-	-	-	-	Tr	-	80
Skunkbush Berries	25	-	-	-	-	100	15
Rose Berries	-	-	-	-	-	-	5
Dandelion	-	16	-	-	-	-	-
Unidentified Plant	-	33	Tr	-	-	-	-
Ponderosa Pine Seeds	70	-	-	-	-	-	-
Chokecherry Berries	5	-	-	-	-	-	-

^{1/} Percent of total volume

Harvest

In 1973, 29,113 sharptails were harvested in southeastern Montana. Rosebud County contributed 5 percent of the sharptail harvest or 1,456 birds. This was the third largest harvest of any county in the state.

Sage Grouse

Few animals are as specialized and specific in their habitat requirements as the sage grouse (*Centrocercus urophasianus*). They depend almost entirely on sagebrush for food and cover. One hundred and twenty-four sage grouse were classified. Figure 3 gives the fall and winter distribution of these sage grouse groups.

Use of Habitat Types

Fall: During this season sage grouse used two subtypes about equally. The big sage-grassland subtype and the alfalfa field subtype, both of the big sage-grassland habitat type, received 38 percent and 39 percent of the use, respectively. The silver sage subtype received 14 percent of all use and the grain field subtype 9 percent.

Winter: Only 18 sage grouse were observed during winter. They were utilizing the silver sage subtype.

Table 22. Fall and winter habitat use by sage grouse from 124 observations.

Habitat Type	Fall (106)	Winter (18)
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	38 ^{1/}	-
Silver Sage Subtype	14	100
Alfalfa Field Subtype	39	-
Grain Field Subtype	9	-
<u>1/ Percent of seasonal use</u>		

Activity and Use of Topography

Forty-four percent of the birds observed during fall were feeding. Twenty-five percent were sitting, 18 percent flying and 13 percent walking. All the birds were observed on flat terrain.

Table 23. Seasonal activity and use of topography by sage grouse from 124 observations.

Activity: 124 Observations

	<u>Sit</u>	<u>Walk</u>	<u>Fly</u>	<u>Feed</u>
Fall	25 ^{1/}	13	18	44
Winter	-	-	100	-

Use of Topography: 116 Observations

	<u>Flat</u>	<u>Meadow</u>	<u>Plateau</u>	<u>Coulee</u>
Fall	54	15	31	-
Winter	-	-	-	100

1/ Percent of seasonal use

Food Habits

Martin and Pyrah (1971) stated that various species of sagebrush provide the bulk of the sage grouse diet in fall and winter and that big sagebrush comprises nearly 100 percent of the winter diet. Patterson (1952) stated, "The year-round diet of adult grouse was comprised of nearly 96 percent plant material. Only during the summer months does sagebrush compose less than 80 percent of the total volume of food consumed."

Harvest

In 1973 sage grouse comprised 16 percent of the upland game bird harvest in southeastern Montana, or 7,636 birds. Rosebud ranked second with 1,219 birds.

Pheasant

The ring-necked pheasant (*Phasianus colchicus*) is a composite of the Chinese pheasant, the English pheasant and the Mongolian pheasant. Pheasants were successfully introduced into Oregon from China in 1881 and were apparently introduced into Montana before 1895. Two hundred and thirty-one observations of pheasants were recorded. Figure 3 shows distribution.

Use of Habitat Types

Fall: Thirty-eight percent of the observations were in the alfalfa field subtype of the ponderosa pine type. This was followed by 28 percent of the observations in the alfalfa field subtype of the big sage-grassland habitat type. Therefore, 66 percent of all the pheasant observations were in alfalfa meadows. Nineteen percent of the observations were in the deciduous shrub type, which is usually associated with hay meadows. Altogether, approximately 85 percent of all the pheasant observations were in close association with meadows and the deciduous cover of creek bottoms.

Winter: Fifty-eight percent of all the observations of pheasants were in deciduous shrub cover of creek bottoms. This was followed by 26 percent of the observations in alfalfa fields and 13 percent in roadside vegetation.

Table 24. Seasonal habitat use by pheasants from 231 aerial and ground observations.

Habitat Type	Fall	Winter
Ponderosa Pine Habitat Type		
<i>Rhus</i> -Grassland Subtype	-1/	4
Deciduous Shrub Subtype	19	50
Alfalfa Field Subtype	38	9
Roadside Vegetation	1	13
Pasture Subtype	1	-
Big Sage-Grassland Habitat Type		
Big Sage-Grassland Subtype	1	-
Deciduous Shrub Subtype	10	8
Alfalfa Field	28	17
Greasewood Subtype	1	-

1/ Percent of seasonal use

Activity and Use of Topography

Fall: The major activity of pheasants observed was feeding. Three-fourths of all birds seen were carrying on this activity, followed by 16 percent walking. All birds observed were using flat terrain. Ninety-six percent of these observations were in meadows.

Winter: Ninety-nine percent of the birds observed were feeding. Ninety-one percent of the birds were observed on flat terrain; 62 percent of these in meadows and 29 percent on roads.

Table 25. Seasonal activity and use of topography by pheasants.

Activity: 154 Observations

	<u>Walk</u>	<u>Run</u>	<u>Feed</u>	<u>Stand</u>	<u>Fly</u>	<u>Roost</u>
Fall	16 ^{1/}	1	76	6	1	-
Winter	-	-	99	-	-	1

Topography: 134 Observations

	<u>Hillside</u>	<u>Road</u>	<u>Meadow</u>	<u>Flat</u>
Fall	-	1	96	3
Winter	9	29	62	-

^{1/} Percent of seasonal activity or use

Food Habits

Food habits of pheasants in Montana are quite varied. Hiatt (1947) found 13 plant species in their year-round diet. Cultivated grains made up the major portion of the diets, followed by cutworms, grasshoppers, snowberry seeds, beans and field crickets. Haitt's food habits study was conducted in the highly agricultural portion of the Bighorn valley. Pheasant populations in regions of less intensive agriculture, such as the Birney-Decker area, have to depend more on naturally occurring food supplies.

In the fall of 1973, 16 crops were collected from pheasants. False flax (*Camelina* spp.) seeds composed 26 percent of the diet. Another 25 percent of the diet was made up of a seed whose identity remains unknown. Wild oats composed 17 percent of the diet. Chokecherry, ponderosa pine seeds, and alfalfa composed 5, 5 and 9 percent of the diet, respectively. The only animal component was grasshoppers at 5 percent.

Only one full crop was collected during the winter of 1973-74. This contained 27 percent alfalfa leaves and seed and 12 percent of the unknown seed. The other 61 percent was unidentifiable items.

Harvest

In 1973, 8,432 pheasants were harvested in eastern Montana. Rosebud had the third biggest harvest in this part of the state, with 13 percent or 1,097 birds as compared with Powder River County with 253 birds.

Turkeys

Historical records indicate wild turkeys were probably not native to Montana. The successful transplants of wild-trapped Merriam's turkeys in Wyoming and South Dakota encouraged the Montana Department of Fish and Game to undertake a similar project in 1954. After evaluation of turkey habitat in Colorado and South Dakota, Merriam's turkeys were released in three selected areas of Montana.

The first release, consisting of 13 turkeys (5 gobblers and 8 hens) from Colorado, was made November 13, 1954 in Limekiln Gulch near Lewistown. On three different occasions additional turkeys were received from Wyoming. On January 27, 1955, 18 turkeys (5 gobblers and 13 hens) were released near Capitol Rock in the Long Pines of southeastern Montana near Ekalaka. In October 1956 and January 1957, a total of 26 birds were released in the Beaver Creek area near Ashland. These introductions flourished and provided huntable populations as well as transplanting stock for additional flocks.

Turkeys have been most successful in forests such as the Long Pines where about one-half the cover consists of ponderosa pine with the remainder grasses, deciduous trees and brush, in scattered small openings and drainageways throughout the forest. Very large open areas in the forest appear to have little value, as turkeys seldom venture far from the cover around the edge of openings.

The department undertook a study of turkeys in the Long Pines during 1961-63. This study showed that turkey activities center around ponderosa pine, grassland and deciduous trees and brush. Mature ponderosa pine trees were preferred for roosting, and denser stands of smaller trees were used for loafing and escape cover. Stands of pole-size pine with an open understory and good ground cover were used by turkeys during all seasons (Greene and Ellis 1971).

Groups of turkeys were observed four times during the past fall and winter seasons. The four groups contained 5, 30, 20 and 14 turkeys, respectively. All observations were within the boundaries of the Ashland Division of the Custer National Forest (Figure 3).

Food Habits

Wild turkeys use a wide variety of food, including seeds, fruits, berries, leaves and insects. The seeds of ponderosa pine are preferred when available. The fruits and berries of different plants in the diet varied according to difference in annual yields. When available, domestic grain was often utilized in winter. Grass was an important food item at all times, especially during the green and seedhead stage. Of the animal matter included in the diet, grasshoppers were the most important item (Greene and Ellis 1961).

Harvest

In 1973, 101 turkeys were harvested in Powder River County. Hunters had 32 percent success. In Rosebud County 21 turkeys were harvested. Hunters had 26 percent success.

Partridge

Since chukar partridge were not observed and Hungarian partridge were seen infrequently, they will not be discussed in this report.

Waterfowl

The important migratory birds in Montana are ducks, geese and swans. There are 48 species in this family on the North American continent. In Montana 33 species have been recorded.

Fall and winter distribution of ducks is associated with weather conditions and migration habits. Species such as blue-winged teal and pintail start migrating in late August. The majority of the mallard migration occurs shortly before freeze-up, usually the latter part of November. A few species of ducks, predominantly mallards and goldeneye, winter in Montana on warm water areas or open waters on rivers and lakes. During some winters, up to 150,000 mallards remain in Montana. The fluctuation of wintering birds in the state is associated more with weather conditions rather than population levels (Witt and Salinas 1971).

Ducks and geese use the Tongue River and Reservoir, and stockponds as resting and feeding stops during fall migration. On October 8, 1974, a flight up the Tongue River from Ashland revealed over 200 mallards, 60 teal, 12 gadwalls, 11 mergansers, 80 baldpates, and numerous goldeneyes. The reservoir itself had some 50 redheads, 30 gadwalls, 100 coots, 20 mallards, 45 baldpates, 35 cormorants, 87 Canada geese, 1 snow goose and numerous other ducks that were not identified.

In January, approximately 160 mallards were sighted in the Tongue River canyon. The 10 miles of river below the dam meander through a canyon. This section of the river is used the heaviest by resting and feeding ducks and geese. This is probably due to the relative lack of disturbance, and protection of the canyon walls.

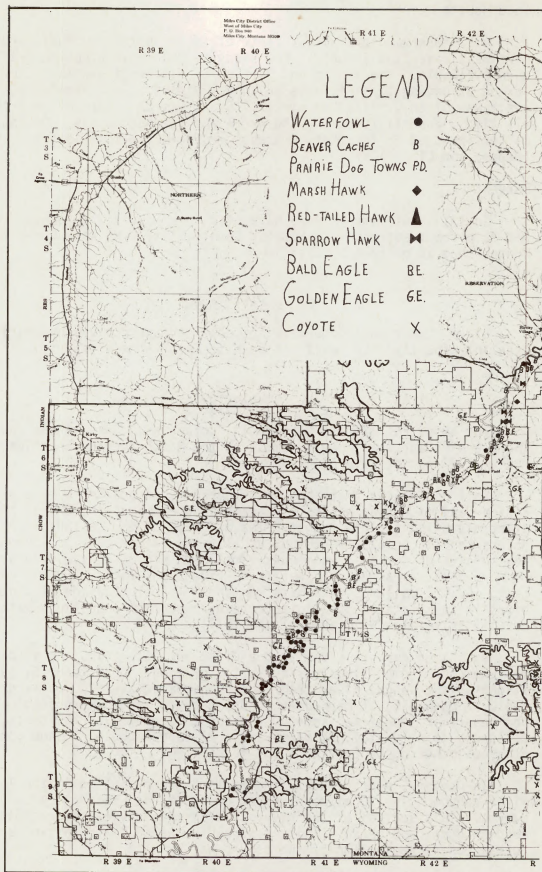


Figure 4. Nongame fall and winter distribution.

BIRNEY-DECKER PLANNING UNIT
MILES CITY DISTRICT MONTANA

R 43 E R 44 E R 45 E R 46 E R 47 E

T 3 S
T 4 S
T 5 S
T 6 S
T 7 S
T 8 S
T 9 N

CUSTER NATIONAL FOREST
BUREAU OF LAND MANAGEMENT
MONTANA

BUREAU OF LAND MANAGEMENT
BUREAU OF LAND MANAGEMENT
BUREAU OF LAND MANAGEMENT

43 E 44 E 45 E 46 E 47 E

Harvest

The annual waterfowl harvest since 1957 has ranged from 100,000 to over 300,000 birds. Waterfowl surveys (east of the divide) showed 250,000 to 350,000 pairs of ducks present annually during the 1965-68 breeding seasons, and 139,000 to 268,000 harvested during those years. The mallard ranks first in the hunter's bag, comprising 65 to 75 percent of the duck harvest (Witt and Salinas 1971).

Nongame

Nongame animals observed were the following:

Great horned owl	Turkey vulture
Broad-winged hawk	Muskrat
Swainson's hawk	Beaver
Red-tailed hawk	Skunk
Rough-legged hawk	Porcupine
Sparrow hawk	Pine squirrel
Marsh hawk	Prairie dogs
Bald eagle	Variety of ducks
Golden eagle	Canada geese
Coyote	Snow geese
Bobcat	White pelicans
Great blue heron	Whistling swans

Other species of interest for which there is no quantitative data as yet are:

Red fox	Cormorant
Raccoon	Osprey
Badger	Mink
Mourning dove	Weasel
Ferruginous hawk	Prairie falcon

Rough-legged hawks appear to use at least this part of Montana for a wintering area. During the summer, sparrow hawks are seen mostly over the grassland and sagebrush areas, and red-tailed hawks are seen over the timber type as well as over open terrain. Marsh hawks are more common during summer, but some seem to stay all year long (Figure 4).

Bald eagles are not too common right in the Birney-Decker area, yet more seem to winter in the area, especially along the Tongue River, than are seen in summer. Golden eagles inhabit the area year-round, and are relatively common compared to most of the country. There appears to be a small population of turkey vultures that summers about 3 miles up river from Birney.

Coyotes are common throughout the entire area. Most were observed in the grassland and sagebrush terrain. This was probably because they were easier to spot.

Beaver caches were located along the Tongue River by biologist Pete Martin. Locations are shown in Figure 4.

Literature Cited

- Allen, E. 1971. White-tailed deer. *In* Game Management in Montana. Mussehl & Howell (ed.) Helena. 238 pp.
- Bayless, S. 1969. Winter food habits, range use and home range of antelope in Montana. *J. Wildl. Mgmt.* 33(3): 538-551.
- Bureau of Land Management. 1975. Pers. comm.
- Brown, R. L. 1971. Sharp-tailed grouse. *In* Game Management in Montana. Mussehl & Howell (ed.) Helena. 238 pp.
- Compton et al. 1971. Pronghorn antelope. *In* Game Management in Montana. Mussehl & Howell (ed.) Helena. 238 pp.
- Decker-Birney Resource Study. 1973. Bur. of Land Mgmt.
- Dusek, G. L. 1973. Bull mountains coal field study (prog. rept.) Mont. Dept. of Fish & Game. Helena. 53 pp.
- Eustace, C. D. 1974. Big game survey and inventory (deer). Job Prog. Rept. Mont. Dept. of Fish and Game. Unpubl. 11 pp.
- Greene, R. and R. Ellis. 1971. Merriam's turkey. *In* Game Management in Montana. Mussehl & Howell (ed.) Helena. 238 pp.
- Hiatt, R. W. 1947. The relation of pheasants to agriculture in the Yellowstone and Bighorn river valleys of Montana. Mont. Dept. of Fish & Game. Helena. 72 pp.
- Hillman, C. N. and W. W. Jackson. 1973. The sharp-tailed grouse in South Dakota. South Dak. Dept. of Game, Fish & Parks. Tech. Bull. No. 3. Pierre, S.D. 64 pp.
- Knapp, S. J. 1972. Range use of mule deer prior to initiation of rest-rotation grazing for cattle on the Ft. Howes Ranger District, Custer National Forest, Montana. Unpubl. M.S. thesis. Mont. St. Univ., Bozeman. 50 pp.
- Mackie, R. J. 1970. Range ecology and relations of mule deer, elk and cattle in the Missouri River breaks, Montana. *Wildl. Monogr.* No. 20. 79 pp.
- _____. 1972. Pers. comm. Associate Professor. Mont. St. Univ., Bozeman.
- Martin, P. R. 1975. Sarpy basin wildlife ecology study. Mont. Dept. of Fish & Game. Helena. 58 pp.
- Martin, N. and D. Pyrah. 1971. Sage grouse. *In* Game Management in Montana. Mussehl & Howell (ed.) Helena. 238 pp.

- Patterson, R. 1952. The sage grouse in Wyoming. Sage Books Inc. Denver, Colo. 341 pp.
- Pepper, G. W. 1972. The ecology of sharp-tailed grouse during spring and summer in the aspen parklands of Saskatchewan. Sask. Dept. of Natl. Res. Wildl. Rept. No. 1. 56 pp.
- Taylor, W. P. 1956. The deer of North America. Stackpole Co. Harrisburg, Penn. 668 pp.
- U. S. Forest Service. 1971. Management plan, west O'Dell allotment. Ft. Howes Ranger District, Custer National Forest. Unpubl. 19 pp.
- Wentland, H. J. 1968. Summer range habits of the pronghorn antelope in central Montana with special reference to proposed sagebrush control study plots. Unpubl. M.S. thesis. Mont. St. Univ., Bozeman. 64 pp.
- Witt, D. and J. Salinas. 1971. Waterfowl. In Game Management in Montana. Mussehl & Howell (ed.) Helena. 238 pp.



